

REMARKS

Rejections Under 35 USC §102 and 35 USC §103

Claims 1, 2, 4, 6, 9-16, 19, 26 and 27 have been rejected under 35 USC §102(b) as being anticipated by Farnworth et al. (US Patent No. 5,716,218).

Claims 5, 17, 18 and 20 have been rejected under 35 USC §103(a) as being unpatentable over Farnworth et al. (US Patent No. 5,716,218) in view of Gilleo et al. (US Patent No. 6,020,220).

The rejections under 35 USC §102 and 35 USC §103 are traversed for the reasons to follow.

Summary of the Invention

The claims are directed to an interconnect 10 (Figure 1A) for a semiconductor component 14 (Figure 1D) having a component contact 16 (Figure 1D). The interconnect 10 (Figure 1A) includes a substrate 18 (Figure 1F) and an interconnect contact 22 (Figure 1F) on the substrate 18 (Figure 1F) configured to electrically engage the component contact 16 (Figure 1F). The interconnect contact 22 (Figure 1F) comprises a compliant conductive layer 42 (Figure 1F) having a tip portion 36 (Figure 1F) for contacting the component contact 16 (Figure 1F), a shaped spring segment portion 44 (Figure 1F) supporting the tip portion 36 (Figure 1F), and a hollow interior portion 38 (Figure 1F) at least partially enclosed by the spring segment portion 44 (Figure 1F), the tip portion 36 (Figure 1F) and the substrate 18 (Figure 1F).

The compliant conductive layer 42 (Figure 1F) can comprise a metal, a conductive polymer or a tape material. As shown in Figures 1B and 1C, the shaped spring segment

portion 44 (Figure 1F) can have a stepped shape open on two sides. As shown in Figure 1H, the tip portion 36P can include a penetrating structure 48P configured to penetrate the component contact 16. As shown in Figure 1I, the tip portion 36PP can comprise a conductive polymer having penetrating particles 50PP.

Argument

A proper 35 USC §102 rejection requires that each and every limitation of the claimed invention be disclosed in a single prior art reference. In addition, the reference must be enabling and describe the applicant's claimed invention sufficiently to have placed it in possession of a person of ordinary skill in the field of the invention. In re David C. Paulsen, 30 F.3d 1475, 31 USPQ 2d (BNA) 1671, (U.S. App 1994).

The claims have been amended with additional limitations intended to further distinguish the claimed invention from the prior art. Specifically, the claimed interconnect 10 (Figure 1A) includes a compliant conductive layer 36 (Figure 1F) having a tip portion 42 (Figure 1F) and a spring segment portion 44 (Figure 1F) which are separate from the substrate 18 (Figure 1F). In addition, the tip portion 42 (Figure 1F) is configured for movement with flexure of the spring segment portion 44 (Figure 1F) independently of the substrate 18.

In Farnworth et al. a contact structure 24 (Figure 6) includes a conductive layer 45 (Figure 6). However, the conductive layer 45 (Figure 6) does not include a spring segment portion as presently claimed. Rather, the conductive layer 45 (Figure 6) is supported by a flexible membrane portion 42 (Figure 6) of the substrate 10 (Figure

6). The flexible membrane portion 42 (Figure 6) of the substrate 10 (Figure 6), rather than the conductive layer 45 (Figure 6) as in the present case, is adapted to flex during electrical engagement (column 7, lines 66-67).

In order to emphasize this feature of the present interconnect, independent claim 1 has been amended to state "the tip portion configured to electrically engage the component contact and to move independently of the substrate with flexure of the spring segment portion". Antecedent basis for this recitation is contained on page 9, lines 15-19, and on page 9, lines 25-27 of the specification. In Farnworth et al. the conductive layer 45 (Figure 6) moves with the flexible membrane portion 42 (Figure 6), which is part of the substrate 10 (Figure 6).

Independent claim 1 has also been amended to state that the tip portion 42 (Figure 1F) is "elevated with respect to the substrate". Antecedent basis for this recitation is contained on page 9, lines 5-8 of the specification. In Farnworth et al. the tip portion of the conductive layer is "on" the substrate 10 (i.e., on the flexible membrane 42) rather than being elevated with respect to the substrate 10.

Independent claim 1 has also been amended to state that the hollow interior portion 38 (Figure 1F) is "at least partially enclosed by the spring segment portion, the tip portion and the substrate". Antecedent basis for this recitation is contained in the drawings, including Figure 1F where the hollow interior portion 38 is shown as being enclosed by the tip portion 36, the spring segment portion 44 and the substrate 10. Although, Farnworth et al. discloses a hollow interior portion (pocket 26-Figure 6) it

is in the substrate 10, not enclosed by the substrate as presently claimed.

Independent claim 14 has also been amended to include additional limitations intended to distinguish the claimed interconnect from the prior art. In particular, claim 14 recites the substrate has a "planar side", which is the planar first side 26 (Figure 1F) described on page 9, line 8 of the specification. Claim 14 also states the hollow interior portion of the compliant conductive layer is "at least partially enclosed by the planar side".

Claim 14 also states that the tip portion is "elevated with respect to the planar side", and is "configured to electrically engage the component contact and to move independently of the substrate with flexure of the spring segment portions." Antecedent basis for these recitations is contained on page 9, line 8, and page 9, lines 25-28 of the specification.

Independent claim 23 has been amended with recitations similar to claims 1 and 14. Specifically, claim 23 states that the tip portion is "supported by the spring segment portion for movement independently of the substrate during electrical contact of a component contact". Claim 23 also recites a hollow interior portion "at least partially enclosed by the spring segment portion, the tip portion and the substrate". As previously argued, these additional recitations are submitted to patentably distinguish the claimed invention from the prior art.

In addition to the amended claims being novel over Farnworth et al., they are also unobvious over Farnworth et al. In this regard, each of the additional recitations defines features which improve the performance of the interconnect. For example, the spring segment portions

can be fabricated with a precise spring constant. In addition, the independent movement of the compliant conductive layer relative to the substrate allows variations in the planarity of the component contacts to be accommodated.


The 35 USC §103 rejections over Farnworth et al. and Gilleo et al. are traversed for essentially the same reasons as argued above. Specifically, the above features not described by Farnworth et al., are also not described by the combination of Farnworth et al. and Gilleo et al. Further, although conductive polymers with penetrating particles are known in the art, they have not been heretofore employed to construct a compliant conductive layer having the claimed features. In this regard, a known material (e.g., conductive polymer) can be used to construct a patentable structure (e.g., compliant conductive layer).

Conclusion

In view of the amendments and arguments, favorable consideration and allowance of claims 1-2, 4-6, 9-24 and 26-27 is respectfully requested. In addition, rejoinder of non-elected dependent claims 3, 7, 8, 25 and 28 is requested. An Information Disclosure Statement is also being filed concurrently with this Amendment. Should any issues remain the Examiner is asked to contact the undersigned by telephone.

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